Grouper: Jurnal Ilmiah Perikanan
Vol. 17 No. 1 (2026) pp. 16 - 29
pISSN: 2086-8480 | eISSN: 2716-2702
Journal Homepage: https://grouper.unisla.ac.id/index.php/grouper

Analysis of Factors Affecting the Income of Vaname Shrimp Farming Businesses (*Litopenaeus vannamei*) in Parigi District, Pangandaran Regency

Ika Ayu Lestari*[1], Ine Maulina[2], Nora Akbarsyah[1], Asep Agus Handaka Suryana[2]

[1]Department of Tropical Marine Fisheries, Faculty of Fisheries and Marine Sciences, Padjadjaran University, Indonesia

[2]Department of Fisheries, Faculty of Fisheries and Marine Sciences, Padjadjaran University, Indonesia

*Correspondence Author: ika22001@mail.unpad.ac.id

Submitted: 09 Maret 2026 Revised: 14 April 2026 Accepted: 15 April 2026

Keywords:
Aquaculture business analysis; Aquaculture system; Business revenue; Multiple linear regression; Production costs

ABSTRACT

Vaname shrimp (*Litopenaeus vannamei*) farming is a highly profitable fishery business with the potential to increase farmers' income. This study aims to analyze the income from vaname shrimp farming in Parigi Subdistrict, Pangandaran Regency, and to analyze the factors that affect the income from this farming business. The study used a survey method with a quantitative approach. Data collection was conducted through observation, interviews, and questionnaires with vaname shrimp farmers. Data analysis was performed descriptively to describe the characteristics of the pond farming system, as well as quantitatively using cost and income analysis and multiple linear regression analysis. The results showed that the farming systems used consisted of semi-intensive, intensive, and super-intensive systems with differences in pond area, pond construction, number of water wheels, and stocking density. Business vaname shrimp farming provides profits in each farming system, with an average income per production cycle in semi-intensive ponds of IDR 92,820,000–IDR 201,874,333, intensive ponds of IDR 614,910,492, and super-intensive ponds of IDR 920,702,000. The regression analysis results show that the selling price variable has a significant effect on the income of vaname shrimp farming businesses, while probiotic costs and labor costs do not have a significant effect on income. The research conclusion shows that vaname shrimp farming businesses in Parigi Subdistrict are profitable in every farming system, and the selling price is the factor that has the most significant effect on income.

INTRODUCTION

Indonesia is a maritime country with enormous and diverse marine resources. Indonesia's maritime area covers approximately two-thirds of its total national territory, or around 5.8 million km^2, with more than 17,000 islands and a coastline of approximately 81,000 km (Nikawanti & Aca, 2021). These geographical conditions provide vast opportunities for the development of the fisheries sector, both through marine fish farming using cage systems, freshwater farming using pond systems, and brackish water farming using pond systems. The development of aquaculture businesses is an important strategy in increasing food production, economic growth, and the welfare of coastal communities.

One of the leading commodities in the aquaculture sector is shrimp, which has high economic value and growing market demand. Shrimp is a mainstay of Indonesia's fishery exports, contributing significantly to foreign exchange earnings and job creation (Kasmin *et al.*, 2020). According to data from the Ministry of Marine Affairs and Fisheries (KKP), Indonesia's shrimp export volume in 2020 reached 239.28 million kilograms, with a value of US$2.04 billion, an increase from the previous year (Qonita *et al.*, 2024). High global demand makes the development of shrimp farming a strategic opportunity to increase the competitiveness of the national fisheries sector.

Vaname shrimp (*Litopenaeus vannamei*) is one of the leading commodities that is widely cultivated because it has various biological and technical advantages, such as fast growth rate, high survival rate, responsiveness to feed, and relatively short cultivation time of around 90–100 days per cycle (Purnamasari *et al*., 2017). Based on data from the Directorate General of Aquaculture, Indonesia's aquaculture production in 2024 reached 14,153,932 tons, with vaname shrimp as the main commodity contributing to exports of 214.58 thousand tons with a value of USD 1.68 billion (Ministry of Maritime Affairs and Fisheries, 2025). This shows that the development of vaname shrimp aquaculture has great economic potential and promising prospects.

However, the income level of vaname shrimp farmers is not always stable and is influenced by various production and business management factors. The use of production inputs such as fry, feed, fertilizers, pesticides, labor, and the application of cultivation technology can affect business productivity and efficiency, which ultimately has an impact on farmers' income (Megawati *et al*., 2024). Business income from aquaculture is an important indicator in assessing business success because it reflects the difference between revenue and total production costs incurred (Hidayat *et al*., 2024). Variations in the use of production inputs and differences in business scale cause differences in income levels between regions and aquaculture systems.

Previous studies have shown variations in vaname shrimp farming income in various regions in Indonesia. The income of farmers in Indramayu Regency was recorded at IDR 12.29 million/ha per season (Legita *et al*., 2024), while in Tolai Timur Village, Parigi Moutong Regency, it was IDR 21.06 million/ha/season using the traditional system (Sulnidar *et al*., 2022). In the intensive system in Bangkalan Regency, income reached IDR 238.13 million per production period (Jamilah, 2024). Research in Situbondo also shows significant differences between traditional and intensive systems (Farionita *et al*., 2018), while in Maros Regency, income varies based on land area scale (Asmawati *et al*., 2022). These findings indicate that production factors, cultivation technology, and business characteristics play an important role in determining income levels.

Pangandaran Regency, West Java Province, has the potential for developing vaname shrimp farming due to its ±91 km coastline directly bordering the Indian Ocean (Sudinno *et al*., 2018; Fauzan *et al*., 2023). Parigi District is one of the areas with growing vaname shrimp farming activities. However, to date, no study has specifically analyzed the factors that influence the income of vaname shrimp farming businesses in this region. Therefore, this study aims to analyze the income of vaname shrimp farming businesses in Parigi District, Pangandaran Regency, and analyze the factors that influence the income of these farming businesses.

METHOD

Time and Place

The research was conducted from January to March 2026, covering the preparation, data collection, and data analysis stages. The research location was at a vaname shrimp (*Litopenaeus vannamei*) farming business in Parigi Subdistrict, Pangandaran Regency, West Java Province. The location was selected purposively, considering that the area is one of the centers for vaname shrimp farming development in Pangandaran Regency.

Research Design

This study used a survey method with a quantitative approach. Data were collected through observation, interviews, and questionnaires administered to vaname shrimp farmers in Parigi Subdistrict. Data analysis was performed descriptively to describe the characteristics of the pond cultivation system and quantitatively using cost and income analysis and multiple linear regression analysis to determine the factors that influence the income of vaname shrimp cultivation businesses.

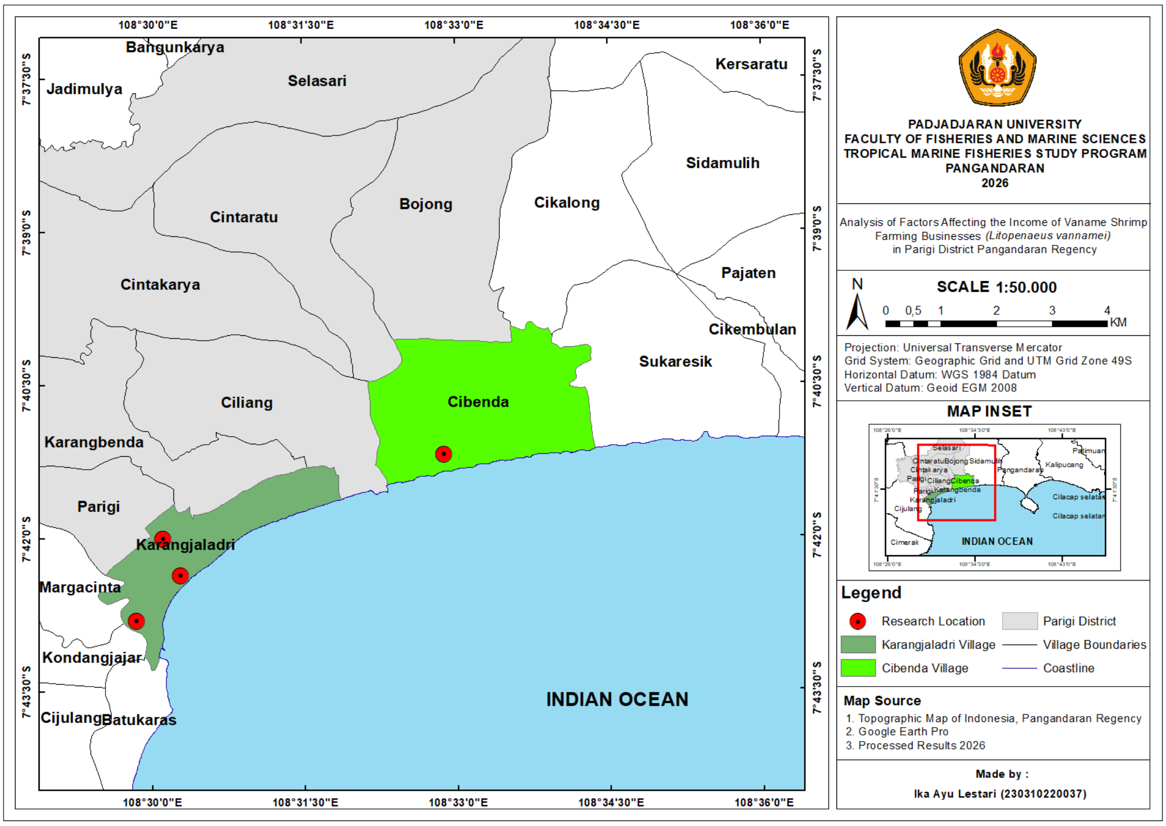


Figure 1. Research location map
Source: Processed data (2026)

Population and Sampling Techniques

The population of this study consisted of all vaname shrimp farming units located in Parigi Subdistrict, Pangandaran Regency. A census (total sampling) technique was applied, meaning that all members of the population were included as research respondents. Therefore, the sample in this study was identical to the population, consisting of four active vaname shrimp ponds: two semi-intensive ponds, one intensive pond, and one super-intensive pond. This information was obtained from the Pangandaran Regency Marine, Fisheries, and Food Security Agency and verified through a pre-field survey.

Types and Source of Data

The data used in this study consists of:

a. Primary Data; obtained through direct observation, structured interviews using questionnaires, and field documentation. The data collected included characteristics of the ponds, use of production inputs, production costs, production volume, and shrimp selling prices.
b. Secondary Data; obtained from relevant agencies, official reports, scientific journals, books, and other literature relevant to the study.

Data Collection Techniques

The data collection stages include:

1. Pre-survey to identify the conditions of active vaname shrimp ponds.
2. Direct observation of cultivation activities.
3. Structured interviews with farmers using questionnaires.
4. Documentation as supporting data.
5. Literature study to strengthen analysis and discussion.

Research Variables

The dependent variable (Y) in this study is farming income (IDR/production cycle). The independent variables initially consisted of six variables, namely production volume (X1), shrimp selling price (X2), seed cost (X3), feed cost (X4), probiotic cost (X5), and labor cost (X6). However, all variables were subjected to classical assumption testing, particularly multicollinearity testing. Variables that exhibited high multicollinearity were excluded from the regression model to obtain a more reliable and valid model.

Data Analysis Techniques

Revenue Analysis

Business income from cultivation is calculated as the difference between total revenue and total production costs (Hidayat *et al.*, 2024). Total revenue is calculated using the following formula:

$$TR = P \times Q$$

Description:
TR = Total revenue (IDR)
P = Selling price (IDR/kg)
Q = Production volume (kg)

The total cost is calculated using the formula:

$$TC = FC + VC$$

Decription:
TC = Total Cost (IDR)
FC = Fixed Cost (IDR)
VC = Variabel Cost (IDR)

Revenue is calculated using the formula:

$$\pi = TR - TC$$

Description:
π = Income (IDR)
TR = Total Revenue (IDR)
TC = Total Cost (IDR)

Multiple Linear Regression Analysis

Multiple linear regression analysis was used to examine the effect of several independent variables on one dependent variable simultaneously (Mona *et al.*, 2015). The regression model used in this study is as follows:

$$Y = \alpha + b1X1 + b2X2 + b3X3 + b4X4 + b5X5 + b6X6 + \varepsilon$$

Classical Assumption Test

Classical assumption tests are conducted to ensure that the regression model meets the necessary statistical assumptions before interpreting the analysis results. The tests conducted include:

1. Normality test, using One-Sample Kolmogorov-Smirnov to test the residual distribution. The data is said to be normally distributed if the significance value is > 0.05 (Aisyah *et al.*, 2023).
2. Multicollinearity test, conducted by examining the tolerance and Variance Inflation Factor (VIF) values. The model is considered free of multicollinearity if the tolerance value is > 0.10 and the VIF is < 10 (Aisyah *et al.*, 2023).

3. Test for heteroscedasticity using the Glejser test by looking at the significance value. The model is declared to not experience heteroscedasticity if the significance value is > 0.05.

Statistical Test

Hypothesis testing was conducted through:

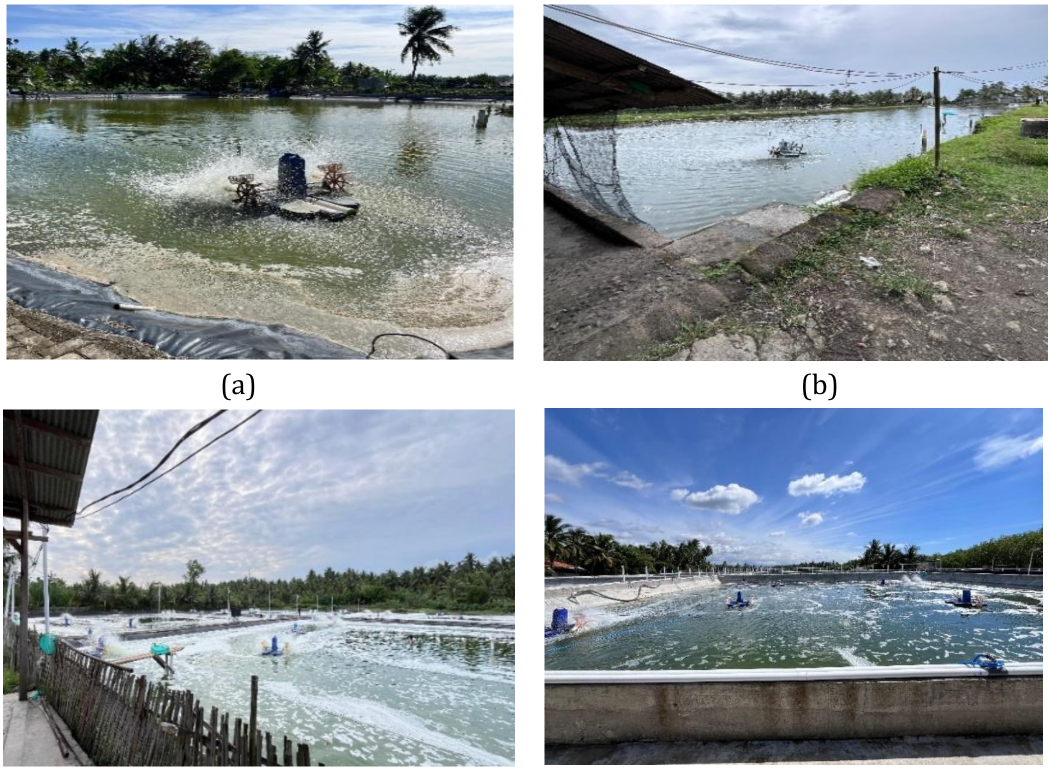
1. F test (simultaneous) to determine the combined effect of independent variables on the dependent variable.
2. t-test (partial) to determine the effect of each independent variable on the dependent variable.
3. Coefficient of determination (R^2) to measure the model's ability to explain the variation in the dependent variable (Sugiyono, 2018).

RESULT AND DISCUSSION

Characteristics of Vaname Shrimp Farming Systems

The vaname shrimp (*Litopenaeus vannamei*) farming system in Parigi Subdistrict, Pangandaran Regency consists of three levels of technology, namely semi-intensive, intensive, and super-intensive (Figure 2). The semi-intensive system uses moderate stocking density and technology, utilizing natural and supplementary feed, while the intensive system has higher production inputs and costs to increase production yields (Nugroho *et al.*, 2016). Meanwhile, the super-intensive system applies more advanced technology with high stocking density on relatively narrow land, resulting in higher productivity (Lailiyah *et al.*, 2018).

The classification of these farming systems is based on the technical characteristics of ponds according to Minister of Marine Affairs and Fisheries Regulation No. 75 of 2016. The factors observed include plot area, pond construction, water depth, number of water wheels, stocking density, and maintenance period.



(a) (b) (c) (d)

Figure 2. Vaname shrimp farming systems: (a) and (b) semi-intensive; (c) intensive; (d) super intensive.
Source: Personal Documentation (2026)

Differences in cultivation systems are evident in the variation in pond size, pond construction, number of water wheels, and stocking density applied by farmers. Differences in the characteristics of vaname shrimp pond cultivation systems are shown in (Table 1).

Table 1. Differences in Characteristics of Vaname Shrimp Farming Systems

Component	Semi-Intensive	Intensive	Super Intensive
Plot area (m^2)	1.667-4.000	±1.385	±1.000
Pond construction	Land/partly HDPE	Full HDPE	Concrete
Water depth (cm)	120-150	120	130
Number of water wheels (units/ha)	20-24	±28	±80
Stocking density (tails/m^2)	50-80	217	600
Rearing period (day)	±100	±100	±120

Source: Processed Data (2026)

Semi-intensive ponds have an area ranging from 1,667 to 4,000 m^2 with a pond construction in the form of earthen ponds partially lined with HDPE plastic. The water depth ranges from 120 to 150 cm with a stocking density of 50 to 80 fry/m^2. Based on Regulation of the Minister of Marine Affairs and Fisheries No. 75 of 2016, these characteristics are still included in the semi-intensive pond category, which generally has a plot area of less than 1 hectare with a medium level of technology use.

Intensive ponds have an average plot area of approximately 1,385 m^2 with the entire pond constructed using HDPE plastic. The water depth reaches approximately 120 cm with a stocking density of 217 fry/m^2. The intensive farming system is characterized by the use of higher production inputs and the application of better biosecurity compared to the semi-intensive system. The use of HDPE plastic on the entire surface of the pond aims to reduce direct contact between the cultivation water and the soil, thereby improving water quality stability.

Super-intensive ponds have an area of approximately 1,000 m^2 with concrete pool construction. The cultivation water depth reaches approximately 130 cm with a stocking density of 600 fry/m^2. This stocking density is in accordance with the stocking density range for super-intensive ponds based on Minister of Marine Affairs and Fisheries Regulation No. 75 of 2016, which is 5,000,000–10,000,000 fry per hectare.

Improvements in cultivation technology are accompanied by an increase in the number of water wheels and fry stocking density. Semi-intensive ponds use around 20–24 units of water wheels per hectare, intensive ponds around 28 units per hectare, while super-intensive ponds reach around 80 units per hectare. This increase in aeration is necessary to maintain dissolved oxygen stability and water quality as shrimp stocking density increases.

The maintenance period for vaname shrimp in all farming systems ranges from 100–120 days per cycle, which is still within the general maintenance period for vaname shrimp farming.

Analysis of Production Costs and Income from Vaname Shrimp Farming
Fixed Costs

Fixed costs are costs that are not affected by the volume of production in a single farming cycle (Assegaf, 2019). Fixed costs in vaname shrimp farming in Parigi Subdistrict include pond depreciation and equipment depreciation, which are calculated using the straight-line method. The fixed costs of vaname shrimp farming can be seen in (Table 2).

The results show that the average fixed cost of vaname shrimp farming is IDR 40,588,417 per production cycle (Table 2). The highest fixed costs were found in super-intensive ponds at IDR 65,348,000 per cycle, while the lowest fixed costs were found in semi-intensive ponds (1) at IDR 14,430,000 per cycle.

Table 2. Fixed Costs of Vaname Shrimp Farming

Shrimp Ponds	Depreciaton of ponds per cycle (IDR)	Depreciaton of equipment per cylce (IDR)	Total fixed costs per cycle (IDR)
Semi Intensive (1)	3.906.667	10.523.333	14.430.000
Semi Intensive (2)	8.433.333	17.467.333	25.900.667
Intensive	15.000.000	41.675.000	56.675.000
Super Intensive	21.400.000	43.948.000	65.348.000
Average	**12.185.000**	**28.403.417**	**40.588.417**

Source: Processed Data (2026)

The amount of fixed costs is influenced by the initial investment value of the pond and the equipment used. Ponds with higher levels of technology require greater investment in production facilities, resulting in higher depreciation costs.

Variable Costs

Variable costs are costs that change in accordance with production levels (Assegaf, 2019). Variable costs in vaname shrimp farming include costs for fry, feed, probiotics, electricity, fuel, labor, and other operational costs. The calculation of variable costs is shown in (Table 3).

The average variable cost of vaname shrimp farming in Parigi District is IDR 894,909,877 per production cycle (Table 3). The highest variable costs are found in super-intensive ponds due to the greater use of production inputs compared to semi-intensive and intensive systems.

The largest variable cost component is feed costs, with an average of IDR 483,314,625 per production cycle, or more than half of the total variable costs. This shows that feed is a major component in vaname shrimp farming because it greatly determines shrimp growth and productivity. Feed requirements are influenced by stocking density and maintenance period. These results are in line with the research by Ulumiah *et al.* (2020), which states that feed costs can reach 60-70% of the total operational costs of vaname shrimp farming.

The next largest variable cost component is electricity costs, with an average of IDR 131,646,375 per production cycle. The amount of electricity costs is influenced by the number of aerators used to maintain water quality and dissolved oxygen stability during the rearing period. Other cost components such as labor, fry, probiotics, equipment repairs, and fuel have a smaller proportion of total variable costs but still play a role in supporting the success of farming activities.

Table 3. Variable Costs of Vaname Shrimp Farming

Pond	Cycle	Fry (IDR)	Feed (IDR)	Probiotics (IDR)	Electricity (IDR)	Fuel (IDR)	Equipment repairs (IDR)	Labor (IDR)	Worker bonuses (IDR)	Total variable costs (IDR)
Semi Intensive (1)	1	10.000.000	117.600.000	6.750.000	8.000.000	7.000.000	2.000.000	12.000.000	15.000.000	178.350.000
	2	6.000.000	58.800.000	3.600.000	5.000.000	6.000.000	1.000.000	12.000.000	9.750.000	102.150.000
Semi Intensive (2)	1	46.800.000	493.000.000	58.000.000	175.000.000	750.000	6.000.000	50.000.000	52.250.000	881.800.000
	2	48.100.000	448.050.000	67.000.000	170.000.000	500.000	7.000.000	50.000.000	57.000.000	847.650.000
Intensive	1	70.200.000	669.231.000	70.582.842	147.093.000	200.000	13.000.000	100.000.000	106.880.000	1.177.186.842
	2	67.600.000	509.436.000	58.428.175	118.078.000	200.000	10.000.000	100.000.000	138.500.000	1.002.242.175
Super Intensive	1	130.000.000	860.700.000	100.000.000	250.000.000	40.000.000	30.000.000	89.200.000	157.500.000	1.657.400.000
	2	104.000.000	709.700.000	80.000.000	180.000.000	30.000.000	30.000.000	89.200.000	89.600.000	1.312.500.000
Average		**60.337.500**	**483.314.625**	**55.545.127**	**131.646.375**	**10.581.250**	**12.375.000**	**62.800.000**	**78.310.000**	**894.909.877**

Source: Processed Data (2026)

Total Production Costs

Total production costs are the sum of fixed and variable costs incurred during one production cycle. The results of the total cost calculation are shown in (Table 4).

Table 4. Total Costs of Vaname Shrimp Farming

Pond	Cycle	Fixed Costs (IDR)	Variable Costs (IDR)	Total Costs (IDR)
Semi Intensive (1)	1	14.430.000	178.350.000	192.780.000
	2	14.430.000	102.150.000	116.580.000
Semi Intensive (2)	1	25.900.667	881.800.000	907.700.667
	2	25.900.667	847.650.000	873.550.667
Intensive	1	56.675.000	1.177.186.842	1.233.861.842
	2	56.675.000	1.002.242.175	1.058.917.175
Super Intensive	1	65.348.000	1.657.400.000	1.722.748.000
	2	65.348.000	1.312.500.000	1.377.848.000
Average		**40.588.417**	**894.909.877**	**935.498.294**

Source: Processed Data (2026)

The average total production cost of vaname shrimp farming in Parigi District is IDR 935,498,294 per production cycle (Table 4). Variable costs contribute the most to total production costs compared to fixed costs. The total production cost is influenced by the farming system used. Ponds with intensive and super-intensive systems require higher production costs due to the use of more advanced farming technology and higher stocking densities.

Revenue

Revenue from vaname shrimp farming is obtained by multiplying the production volume by the selling price of shrimp. The calculation results can be seen in (Table 5).

Table 5. Acceptance of Vaname Shrimp Farming Business

Pond	Cycle	Production volume (Kg)	Selling price (IDR)	Revenue per cycle (IDR)
Semi Intensive (1)	1	5.000	60.000	300.000.000
	2	3.000	65.000	195.000.000
Semi Intensive (2)	1	19.000	55.000	1.045.000.000
	2	20.000	57.000	1.140.000.000
Intensive	1	33.400	64.000	2.137.600.000
	2	27.700	50.000	1.385.000.000
Super Intensive	1	45.000	70.000	3.150.000.000
	2	32.000	56.000	1.792.000.000
Average				**1.393.075.000**

Source: Processed Data (2026)

Based on Table 5, the average revenue from vaname shrimp farming in Parigi Subdistrict is IDR 1,393,075,000 per production cycle. The highest revenue was obtained from super-intensive ponds in cycle 1, amounting to IDR 3,150,000,000, while the lowest revenue was obtained from semi-intensive ponds (1) in cycle 2, amounting to IDR 195,000,000. The difference in revenue was influenced by the difference in production volume and shrimp selling price in each pond. The price of shrimp at the research location varied depending on market conditions and the size of the shrimp produced. The larger the size of the shrimp, the higher the selling price obtained. This is in line with the research by Sulnidar *et al*. (2022), which states that changes in shrimp prices are influenced by domestic and international market conditions. Therefore, determining the harvest time is an important factor in obtaining optimal revenue.

Income

The income from vaname shrimp farming is the difference between total revenue and total production costs (Table 6).

Table 6. Income from Vaname Shrimp Farming

Pond	Cycle	Total revenue (IDR)	Total costs (IDR)	Revenue per cycle (IDR)	Income per year (IDR)	Average income (IDR)
Semi Intensive (1)	1	300.000.000	192.780.000	107.220.000	185.640.000	92.820.000
	2	195.000.000	116.580.000	78.420.000		
Semi Intensive (2)	1	1.045.000.000	907.700.667	137.299.333	403.748.667	201.874.333
	2	1.140.000.000	873.550.667	266.449.333		
Intensive	1	2.137.600.000	1.233.861.842	903.738.158	1.229.820.983	614.910.492
	2	1.385.000.000	1.058.917.175	326.082.825		
Super Intensive	1	3.150.000.000	1.722.748.000	1.427.252.000	1.841.404.000	920.702.000
	2	1.792.000.000	1.377.848.000	414.152.000		

Source: Processed Data (2026)

The results of the study show that vaname shrimp farming in Parigi Subdistrict is profitable for the entire farming system, as indicated by positive income values. The highest average income was obtained in super-intensive ponds, amounting to IDR 920,702,000 per production cycle, followed by intensive ponds at IDR 614,910,492 per cycle, and semi-intensive ponds at IDR 92,820,000–IDR 201,874,333 per cycle.

The income from vaname shrimp farming in Parigi District is relatively high, especially in intensive and super-intensive systems. This shows that improvements in farming technology can increase productivity and business profits. The results of this study are in line with the research by Hidayat *et al.* (2024), which states that intensive farming systems generate higher income than semi-intensive systems due to more optimal use of production inputs.

The difference in income between ponds is influenced by the amount of production, selling price, and production costs incurred. Ponds with higher levels of technology produce greater yields, resulting in higher incomes. This is in line with Hidayat *et al.* (2024), who state that aquaculture business income is influenced by production levels and prevailing selling prices.

Analysis of Factors Affecting the Income of Vaname Shrimp Farming Businesses

An analysis of the factors affecting the income of vaname shrimp farming businesses was conducted using multiple linear regression. Before performing the regression analysis, classical assumption tests were first conducted, including tests for normality, multicollinearity, and heteroscedasticity.

Classical Assumption Test

Before conducting the multiple linear regression analysis, classical assumption tests were performed to ensure that the regression model meets the required statistical assumptions. These tests include normality, multicollinearity, and heteroscedasticity tests. The results of the classical assumption tests are presented in Table 7.

Table 7. Results of Classical Assumption Tests

Test Type	Indicator / Variable	Value	Criteria	Conclusion
Normality Test	Asymp. Sig. (K-S)	0.200	> 0.05	Normally distributed
Multicollinearity	Selling price	Tol: 0.899 / VIF: 1.113	Tol > 0.1; VIF < 10	No multicollinearity
	Probiotic costs	Tol: 0.263 / VIF: 3.798	Tol > 0.1; VIF < 10	No multicollinearity

Test Type	Indicator / Variable	Value	Criteria	Conclusion
	Labor costs	Tol: 0.259 / VIF: 3.854	Tol > 0.1; VIF < 10	No multicollinearity
Heteroscedasticity	Selling price	0.381	> 0.05	No heteroscedasticity
	Probiotic costs	0.310	> 0.05	No heteroscedasticity
	Labor costs	0.424	> 0.05	No heteroscedasticity

Source: Processed Data (2026)

The results of the classical assumption tests are presented in Table 7. The normality test shows an Asymp. Sig. value of 0.200 (>0.05), indicating that the data are normally distributed.

The multicollinearity test results indicate that, in the initial model, several variables showed high multicollinearity (tolerance < 0.1 and VIF > 10). Therefore, the variables of production volume, seed cost, and feed cost were excluded from the model. The final model shows that all remaining independent variables have tolerance values greater than 0.1 and VIF values less than 10, indicating no multicollinearity.

Furthermore, the heteroscedasticity test shows significance values greater than 0.05 for all variables, indicating no heteroscedasticity. Thus, the regression model meets all classical assumptions and is suitable for further analysis.

Multiple Linear Regression Analysis

After conducting the classical assumption tests, the initial results of the multicollinearity test indicated the presence of multicollinearity among several independent variables. Therefore, variables that exhibited high multicollinearity, namely production volume, seed cost, and feed cost, were excluded to improve the reliability of the regression model. After ensuring that the final model met all classical assumption requirements, multiple linear regression analysis was conducted to examine the effect of the remaining independent variables on shrimp farmers' income. The results of the regression analysis are presented in Table 10.

Table 10. Multiple Linear Regression Analysis Results

Variable	Coefficient	t-value	Sig. (p-value)
Constant	-5.801	-5.801	0.004
Selling price (X1)	5.675	5.675	0.005*
Probiotic costs (X2)	1.275	1.275	0.271
Labor costs (X3)	2.264	2.264	0.086

Note: *Significant at α = 0.05
Source: Processed Data (2026)

Based on the results of multiple linear regression analysis, the regression equation is as follows:

$$Y = -5.801 + 5.675X_1 + 1.275X_2 + 2.264X_3$$

The regression results indicate that the selling price variable (X1) has a positive and significant effect on the income of vaname shrimp farming, as indicated by a significance value of 0.005 (<0.05). The regression coefficient of 5.675 indicates that every 1-unit increase in the selling price of vaname shrimp will increase income by Rp 5,675. This indicates that selling price is the primary factor in determining the income earned by shrimp farmers. These results align with Hidayat *et al.* (2024), who state that income is influenced by production levels and selling price.

Conversely, the probiotic cost variable (X2) shows a positive but non-significant effect on income, with a significance value of 0.271 (>0.05). The regression coefficient of 1.275

indicates that an increase in probiotic costs tends to increase income, although this effect is not statistically significant. Theoretically, probiotics can enhance growth, feed efficiency, disease resistance, water quality, and immune response in aquaculture organisms (Subedi & Shrestha, 2020). However, in this study, this effect was not strong enough to significantly influence income, indicating that probiotics play more of a supporting role in aquaculture activities.

The labor cost variable (X3) also shows a positive but non-significant effect on income, with a significance value of 0.086 (>0.05). The regression coefficient of 2.264 indicates that an increase in labor costs tends to increase income, although this effect is not statistically significant. Labor is an important production factor in aquaculture operations (Hidayat *et al*., 2024). However, in this study, its effect on income is not significant, likely due to relatively uniform labor usage across farming units. These results align with Kasmin *et al*. (2020), but differ from Legita *et al*. (2024), which may be due to differences in business scale, technology, and management practices.

Overall, the results indicate that the income of vaname shrimp farming in Parigi Subdistrict is more influenced by selling price than by certain production costs.

F Test

Table 11. F Test Results

Parameter	Value
Calculated F	24.978
Sig F	0.005

Source: Processed Data (2026)

The results of the F-test are presented in Table 11. The significance value of 0.005 (<0.05) indicates that the independent variables, namely selling price, probiotic costs, and labor costs, simultaneously have a significant effect on the income of vaname shrimp farming. This means that the regression model is statistically significant and suitable for further analysis.

T Test

Table 12. T Test Results

Variable	Coefficient	t-value	Sig. (p-value)	Descripstion
Selling price	5.675	0.005	0.005	Significant
Probiotic costs	1.275	0.271	0.271	Not significant
Labor costs	2.264	0.086	0.086	Not significant

Source: Processed Data (2026)

The results of the t-test show that the selling price variable has a significant effect on shrimp farmers' income, as indicated by a significance value of 0.005 (<0.05). Meanwhile, probiotic and labor costs do not have a significant effect on income, with significance values of 0.271 and 0.086 (>0.05), respectively.

The insignificance of probiotic and labor costs suggests that increases in these production costs do not necessarily lead to higher income. This may be because these costs function as supporting inputs rather than primary determinants of income. In contrast, income from vaname shrimp farming tends to be more influenced by output-related factors, particularly selling price.

Determination Test

Table 13. Determination Test Results

Parameter	Value
R	0.974

Parameter	Value
R Square	0.949
Adjusted R Square	0.911

Source: Processed Data (2026)

Based on Table 13, the correlation coefficient (R) of 0.974 indicates a very strong relationship between the independent variables and income. The coefficient of determination (R Square) of 0.949 shows that 94.9% of the variation in shrimp farming income can be explained by selling price, probiotic costs, and labor costs, while the remaining 5.1% is explained by other variables outside the model.

The Adjusted R Square value of 0.911 indicates that, after adjusting for the number of variables, the model still explains 91.1% of the variation in income. This suggests that the regression model has strong explanatory power.

CONCLUSION

Vaname shrimp farming in Parigi Regency generates profits across all farming systems implemented. The average income per production cycle in semi-intensive ponds ranges from IDR 92,820,000 to IDR 201,874,333, in intensive ponds amounts to IDR 614,910,492, and in super-intensive ponds amounts to IDR 920,702,000. This indicates that higher levels of aquaculture technology are associated with greater income for shrimp farmers.mThe regression analysis shows that the selling price variable has a significant effect on shrimp farmers' income, while probiotic and labor costs do not have a significant effect. This suggests that income is more sensitive to output price factors than to variations in certain production costs. Based on these findings, policy interventions should prioritize improving price stability and strengthening market access for shrimp farmers, such as through market regulation, price information systems, and supply chain efficiency. In addition, the development of vaname shrimp farming should be directed toward increasing the adoption of intensive and super-intensive technologies through capital assistance, technical training, and infrastructure support. These efforts are expected to enhance productivity and ensure more stable and sustainable income for shrimp farmers.

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